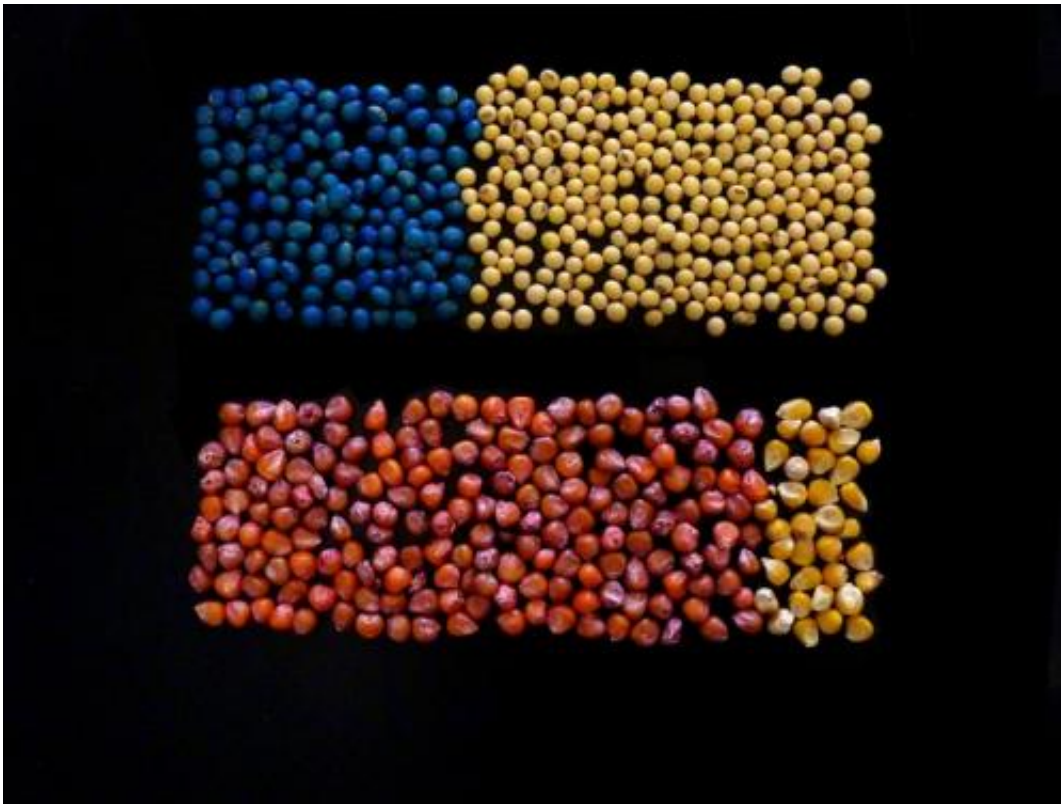


Rapid increase in neonicotinoid insecticides driven by seed treatments

April 2 2015, by Sara Lejeunese



Use of a class of insecticides, called neonicotinoids, increased dramatically in the mid-2000s and was driven almost entirely by the use of corn and soybean seeds treated with the pesticides. Image shows treated soybean seeds (blue), versus untreated soybean seeds at the top and treated corn seeds (red) versus untreated corn seeds at the bottom. Credit: Ian Grettenberger, Penn State

Use of a class of insecticides, called neonicotinoids, increased

dramatically in the mid-2000s and was driven almost entirely by the use of corn and soybean seeds treated with the pesticides, according to researchers at Penn State.

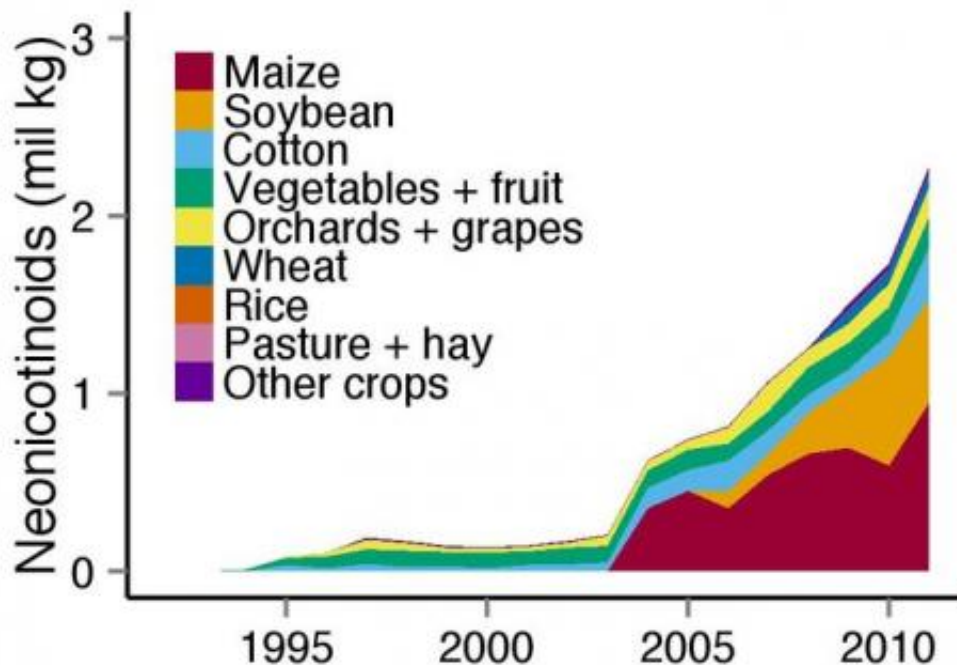
"Previous studies suggested that the percentage of corn acres treated with [insecticides](#) decreased during the 2000s, but once we took seed treatments into account we found the opposite pattern," said Margaret Douglas, graduate student in entomology. "Our results show that application of neonicotinoids to seed of corn and soybeans has driven a major surge in the U.S. cropland treated with insecticides since the mid-2000s."

According to Douglas, research suggests that neonicotinoids may harm pollinators. The European Union suspended neonicotinoid use on bee-attractive crops and the U.S. Environmental Protection Agency is expediting their review.

After discovering that neonicotinoid seed treatments were not explicitly documented in U.S. government pesticide surveys, the researchers synthesized available information to characterize the widespread use of these insecticides. First they compiled pesticide data from two public sources—the U.S. Geological Survey and the U.S. Department of Agriculture—that both reported aspects of neonicotinoid use, but did not estimate seed treatment use specifically. Using these data, together with information from insecticide product labels, the team estimated the percentage of land planted in corn and soybeans in which neonicotinoid-treated seeds have been used since these products were introduced in the mid-2000s. They corroborated their results with information from the U.S. Environmental Protection Agency and DuPont Pioneer, a major seed supplier.

The team found that in 2000, less than 5 percent of soybean acres and less than 30 percent of corn acres were treated with an insecticide, but

by 2011, at least a third of all soybean acres and at least 79 percent of all [corn acres](#) were planted with neonicotinoid-coated seed, constituting a significant expansion in insecticide use. The researchers also found that the vast majority of neonicotinoids are used on crops, rather than in other arenas such as people's homes or gardens, or in turf grass and ornamental settings. The results will appear today (Apr. 2) in *Environmental Science & Technology*.



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"Adoption of neonicotinoid insecticides by seed companies and farmers has been very rapid and does not appear to relate well to a corresponding risk from [insect pests](#)," said John Tooker, associate professor of entomology. "This pattern suggests that neonicotinoids are often being used as an 'insurance policy' against uncertain insect attack, rather than in response to a documented pest threat."

According to Douglas, the results inform an ongoing debate that is driven by detection of neonicotinoids in the environment and their possible negative effects on non-target animals, including wild and managed pollinators.

"Regulators, seed companies, farmers and the public are weighing the costs and benefits of neonicotinoid use," she said. "This debate has been happening in a void of basic information about when, where and how neonicotinoids are used. Our work is holding up a mirror so that this conversation can be informed by basic facts about neonicotinoid use."

In the future, the researchers plan to better document the prevalence of secondary insect pests targeted by seed treatments. They also will explore the unintended effects of [neonicotinoid](#) seed treatments on predatory insects that help to suppress insect pests. Finally, they are studying alternative management practices for early-season insect pests, for instance, using cover crops to reduce pest pressure and foster predatory insects.

Provided by Pennsylvania State University

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